

REMARKS

The Advisory Action dated August 26, 2003 has been received and carefully reviewed. These remarks are responsive to that Action and to the telephonic interview conducted on September 15, 2003.

In the Advisory Action, the Examiner rejects Claims 1,2,4,6, and 7. The Examiner stated that Key discloses a measuring system, for measuring distance by receiving a reflection light beam from an object to be measured, comprising a control arithmetic unit, a light emitting unit for emitting a measuring light beam and a photodetection unit for receiving said reflection light beam from an object to be measured, and for issuing a signal based on a photodetection amount of said reflection light beam, a light amount adjuster for adjusting the photodetection amount of a reflection light beam received by the photodetection unit and obtaining an amount of reflection light based on the result of that adjustment. The Examiner also notes that modification of Key, as suggested by Ohtomo, Kitajima and Inoue result in an apparatus similar to the claimed invention.

The Examiner also explained during the telephonic interview that he was unclear as to the novel characteristics of the present application. Briefly, the present invention claimed relates to a distance measuring system, which makes it possible to perform distance measurement in both a prism measurement mode using a prism as the object to be measured, and a non-prism measurement mode where the prism is not the object to be measured. Thus, the objects to be measured in the present invention are both a prism and a natural object, which are distinctly different in the amount of reflection light. The present invention uses a storage unit to store information related to reflected light and distance for both prism and natural objects. Additionally, it uses a light adjuster to adjust the amount of light that is passed to the photodetection unit, and then uses that adjusted amount of light to determine the distance of the object. In Claim 1, there are several elements that are explicitly stated and are viewed to be novel and unobvious, both singularly and in combination. Explanations of several of these features are described below.

A first element of novelty in the present invention is the interaction between the light amount adjuster, where "said light amount adjuster adjusts the photodetection amount of said reflection light beam received by said photodetection unit at an approximately constant amount and obtains an amount of the reflection light beam based on the result of the adjustment", and the control arithmetic unit, which "compares the obtained amount of the reflection light beam and the photodetection amount ... that is prestored in said storage unit". In other words, the invention is using the light adjuster to vary the amount of light that passes to the photodetection element, and then using that amount of light as the indicator for the object's distance.

The Examiner cites that Key also uses a light adjuster and a control arithmetic unit. However, the operation of the light adjuster and its interaction with the control arithmetic unit are very different in that embodiment. In the Key device, the light adjuster is used to adjust "the attenuation of the light beam so as to fall within predefined intensity operating limits of the detector" (Column 7, lines 58-60), where the detector is an APD which can become inoperative when saturated. The Key device uses the light adjuster simply to ensure proper operation of the APD, since "it is phase information, not intensity information, that is ultimately used in the determination of the range of the object". (Column 7, lines 36-38).

In contrast, the light adjuster in the present invention is used as a component of determining the distance of the object. By adjusting the light by a known attenuation, then measuring the obtained light, this invention uses the received light intensity in the determination of the distance of the object. This is further shown in Claim 2, which explicitly states that the "object to be measured is judged based on the adjusting position of said density filter". Since the Key invention is only concerned with phase information and not the amount of received light, it cannot be relied upon to anticipate this novel element of the invention and reconsideration of the Examiner's position is requested.

A second element of novelty in Claim 1 is the method of selecting "whether said object to be measured is a prism or a natural object". In other words, the present invention has the ability to measure the distance of an object by using traditional prisms, but can also measure the distance of natural objects, using their reflected light as a basis for determining their distance.

The Examiner cites Ohtomo for teaching a method of distinguishing a particular object over another based on the receipt of a characteristic reflected light. In the relied-upon prior art, Ohtomo, an object reflector detecting apparatus is disclosed. The prime motivation for this invention is "to provide an object reflector detecting apparatus which can surely identify the predetermined object reflector with effectively expelling the reflected lights from any other members than the specified object reflector". (Column 1, line 66 – Column 2, line 2) In other words, the Ohtomo apparatus was conceived to insure that natural objects are never measured. In contrast, a specific intention of the present invention is to be able to measure both types of objects. Ohtomo teaches that by using polarized light and polarized lenses, the "detecting section is adapted to detect only the reflected light from the object reflector". (Column 3, lines 62-63). Therefore, the Ohtomo apparatus is unable to measure both prism and natural objects, because its detecting section can only detect prism objects. Therefore, the invention of Ohtomo is not similar to the present invention. Accordingly, even if one skilled in the art were motivated to combine the teachings of Key and Ohtomo, such a modified system would only be able to measure the prism objects. Thus, reconsideration of the Examiner's position is requested.

A third element of novelty in Claim 1 is the storage unit, where "said storage unit prestores a photodetection amount of a reflection light beam from the prism according to distance and a photodetection amount of a reflection light beam from the natural object according to distance". Said in other words, in the present invention, the storage unit stores within it two distinct graphs, one correlating the amount of light received from a prism to the distance of that prism, while the other correlates the amount of light received from a natural object to the distance of that natural object. In this way, the present invention is able to identify the distance of an object, regardless of whether it is a natural object or a prism.

The Examiner cites Inoue for its disclosure of an apparatus comprising a storage unit configured to store values based on distance measurements as reference values to be used by a discrimination unit. In the relied-upon prior art, Inoue, a smoke detection system is disclosed. The operation of the system is such that a detector is placed at a central location, with a number of reflectors placed at various locations, each with a

visual line of sight to the detector. As a part of the setup and configuration of the system, the detector measures and records the absolute distance to each of these reflectors and stores them within its storage unit. The detector then continuously measures the distance to each of these reflectors and compares the measured distance to that reference distance stored in the storage unit. Based on this, "it is possible to detect smoke and flame generation from the results of a comparison between the measured distance and the reference distance". (Column 5, lines 36-38). Additionally, Inoue further clarifies the use of the storage unit as a "storage area to store the rotation and elevation angles, α_0 , β_0 and distance L_0 to each surveillance point". (Column 6, lines 33-35).

Inoue only uses the stored reference distances to compare to the measured distances for purposes of detecting smoke or flame in the path between the detector and the reflector. In contrast, the present invention uses the stored values in order to correlate the measured photodetection amount of reflected light beam of an object with the distance away that object is. This usage and the contents of the storage units are clearly different in these two embodiments. Accordingly, even if one skilled in the art were motivated to combine the teachings of Key and Inoue, such a modified system would not enable the claimed invention. Therefore, reconsideration of the Examiner's position is requested.

The Examiner also cites Kitajima for its disclosure of a mode switch. However, even if one skilled in the art were motivated to combine the teaching of Key and Kitajima, the resulting device would not have all of the elements of the claimed invention.

In addition to the arguments about the novelty of the individual elements as compared to the prior art references, there is also no motivation to combine any or all of these references to produce the present invention.

Inoue is used in a situation where the reflectors are kept at a fixed distance. There is no motivation to look to this reference where the object of the invention is to measure objects at varying distances.

Similarly, Ohtomo teaches the use of polarization to remove unwanted natural light from entering the detection section of a distance measuring system. Ohtomo actually teaches away from the use of both prism and natural objects in their reference.

Allowance is respectfully requested in view of the aforementioned arguments.

Respectfully submitted,



Kevin S. Lemack

Reg. No. 32,579

176 E. Main Street – Suite 7

Westboro, Massachusetts 01581

TEL: (508) 898-1818